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Telling Time by the Stars

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From the moment that man was first able to make himself understood, time undoubtedly became a subject of the utmost importance to him. As his knowledge increased and as his need for a yardstick or a measure of events became more necessary, he began seeking ways of telling time.

Time is important—perhaps the most important thing in our modern world. Without a means of measuring time, there would he chaos. It is true we could struggle along without clocks. We could arise at daybreak and go to bed at sundown, but the modern world could not fit itself to this schedule. Without doubt, as the tempo of life increased and as speed became the obsession of man, the need of a satisfactory method of telling time was man's number one problem.

It is difficult to say just which is the most efficient method of reckoning time, but unquestionably methods of telling time by the stars are among the oldest. The shepherd of biblical times, spending the long hours of the night tending his flocks, was a keen student of telling time by the stars. Even today, while the hustle and bustle of everyday life gives little chance for thought on the matter, it is interesting to note that the clocks at the Naval Observatory at Washington are set to Sidereal Time, the same time that absorbed much of the attention of the shepherd.

Today, of course, with our modern clocks and the many devices for registering time, telling time by the stars on the part of an individual can only be classified as a hobby. It is, however, an interesting one, and one on which many pleasant hours can he spent. In these times, even the smattering of astronomical knowledge necessary to tell time by the stars may have a life or death value to the individual, for we have recently heard of seamen, and soldiers too, adrift on their tiny life rafts, who perhaps owe their lives to just such an acquaintance with the heavens, developed as a hobby interest.

We have definite literary records * of the ancients' ability to tell time by the stars, and even our modern world has not lost the art entirely. Recently there appeared an article in the *National Geographic Magazine,* t relating how the people of the Gilbert Islands, in the war-torn part of the Pacific, taught their children not only to tell time by the stars, but to navigate many thousands of miles by them.

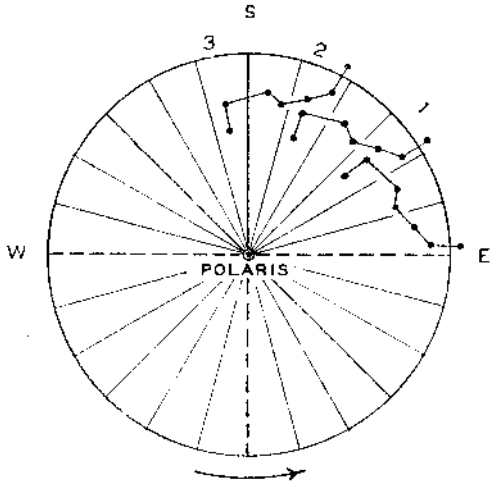
Perhaps the oldest method of telling time by the stars is by the Big Dipper (Ursa Major). This constellation is almost wholly circumpolar in this latitude, thus being visible in clear weather during the

*See Review of Grondal's *Romance of Astronomy* in The *Chicago Naturalist*, Vol. 6, No. 1, 1943, page 20.

t "War Finds its Way to the Gilbert Islands," *National Geographic* Magazine, January, 1943.

entire night. During the winter months, its position is partially below the Pole, so it is not always as easily seen as during the summer months, when it is high in the heavens.

The diagram shows the relative positions of the Big Dipper at the same hour during different months of the year. Knowing that the rotation of the earth causes the constellation to seem to move in a counterclockwise direction, it is simple to compute the time (approximate, of course) by its various locations in the heavens during the night.



Star Dial—the pointer stars, the side of the bowl opposite the handle of the Big Dipper, rotate around the North Star in a counter-clockwise direction, across imaginary hour lines.

Position 1: location of Pointers at 10 P.M. on ~~May~~ Apr. 1. Position 2: location of Pointers at 12 P.M. on ~~May~~ May 1 or at 10 P.M. on ~~June~~ May 1. Position 3: location of Pointers at 2 A.M. on ~~May~~ June 2 or at 10 P.M. on ~~July~~ June 1.

In the diagram, the observer is looking directly at Polaris, the Pole Star, with the perpendicular line representing his meridian and the solid line containing his zenith. The dotted lines represent hour circles, twenty-four in all, for the twenty-four hours of the day. The heavier dotted line at right angles to the meridian is used simply to divide the circumpolar regions into four segments of six hours each, to facilitate our computations. The arrow indicates the direction of apparent motion.

By looking at Polaris with this diagram mentally superimposed on the sky, it is an easy matter to estimate the time. Position 1 indicates the approximate location of the Pointers of the Big Dipper at 10:00 P.M. Central War Time on ~~May~~ Apr 1st at Chicago. Two hours later the Pointers would be at Position 2, four hours later at Position 3, etc.

Because the rotation of the earth is faster by nearly four minutes than the twenty-four hours shown on our clock dials, we can readily see that in fifteen days the Pointers would have gained nearly one hour of position. This gain of approximately one hour in fifteen days or two hours in thirty days would on June 1st at 10:00 P.M. place the Pointers at Position 2 on our imaginary clock, and our reckoning for this date should start from there. By following this procedure we can tell the time of night at any date in the year if the weather is sufficiently clear for the Pointers and Polaris to be visible.

It must be remembered that the method outlined above is rather crude and is intended for the person who does not wish to spend a great deal of time on the subject. It is, however, a fairly satisfactory means of temporal orientation, and with a small amount of study and practice one may become quite adept at telling the approximate time by the stars.

Where exact star time is needed, as by the astronomer or the navigator, then Sideral Time must be computed from an Almanac especially prepared for such use.

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